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Self-Service Technology, Consumer Satisfaction and Consumer Commitment: A Multigroup Investigation

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Abstract

Self-service technology (SST) enables consumers to complete services themselves using a technological interface. Studies of consumer satisfaction and commitment have typically focused on the impact of interpersonal interactions on consumer satisfaction and commitment; however, the impact of SST on these is under researched. Data are collected from 241 hotel guests to explore the impact of SST on consumer satisfaction and on three dimensions of consumer commitment. Multi-group analysis is conducted to examine the possible moderating impacts of consumer type, and frequency of interaction with personal-service and SST on the relationship between consumers' evaluations of services and their overall satisfaction with, and commitment to, the service organisation. Our results suggest personal-service is more important than SST for creating consumer satisfaction and commitment. Additionally, the degree of interaction between hotel guests and staff impacts the contribution that consumers' evaluations of personal-service attributes make to their overall satisfaction with the service. These findings provide insights into the roles of SST and personal-service in service encounters.

Keywords: Consumer satisfaction; Self-service technology; Interpersonal service; Consumer commitment; Multi-group analysis.

Introduction

The adoption of self-service technology (SST) by many service organisations is altering the traditional view of services marketing. SST refers to technological interfaces that allow

customers to produce the service independently of any direct involvement with service employees (Meuter, Ostrom, Roundtree, and Bitner 2000). Examples of SST include the consumer using: (1) automatic teller machines for banking services, (2) pay at the pump facilities at a fuel station, and (3) automatic checkout facilities at hotels. Adoption of such SSTs creates new challenges for services managers. Reducing, or completely eliminating, the need for consumers to interact directly with service employees may lead to profound changes in the way consumers perceive their service experiences. The challenges of managing such SSTs are increasingly recognised in the marketing and services literature (Dabholkar 2000; Meuter et al. 2000, Meuter et al. 2003). Despite this attention, and the increasing importance of SST, there have been few systematic attempts to explore its impact on consumer satisfaction and consumer commitment. This research addresses this area by (1) developing and testing a conceptual framework linking consumer satisfaction and consumer commitment with perceptions of SST and encounters with service employees, and (2) identifying and exploring factors which may moderate these relationships. To achieve this, the paper is presented in four sections. First the relevant literature is briefly discussed and a conceptual framework is developed, this is followed by a discussion of the methodology adopted in the study. Next we present the results, and finally, we discuss the implications of this work for marketing theory and practice.

Conceptual framework

The need for organisations to foster consumer satisfaction is well recognised in the service literature, (see for example Anderson et al. 1994), and consumers evaluations of different elements of their service experience has been shown to affect levels of overall satisfaction with the service (Bitner et al. 1990; Ostrom and Iacobucci 1995; Dabholkar 1996; Spreng et al. 1996; Voss, Parasuraman and Grewal 1998). As a consequence, identifying important service attributes, and their relative impact on consumer satisfaction, enables organisations to focus on those attributes that are particularly important to the consumer and which will have the most impact on consumer satisfaction (Ganesh et al. 2000).

Given that Cronin and Taylor (1992) suggest that important service attributes differ across industries, we expect that these attributes will also differ across service-delivery mode (SST *cf.* personal-service). It is hypothesised that a relationship exists between positive evaluations for SST attributes and personal-service attributes, and overall satisfaction (Churchill and Suprenant 1982; Mittal et al. 1998; Patterson et al. 1997; Spreng et al. 1996; Voss et al. 1998). When performance on service attributes is rated highly, customers are more likely to be satisfied with the total service experience. Therefore the following hypotheses are presented:

H₁: There is a positive relationship between consumers' evaluations of SST performance and their overall satisfaction with the service.

H₂: There is a positive relationship between consumers' evaluations of personal-service performance and their overall satisfaction with the service.

In this study we conceptualise satisfaction as overall satisfaction with the service (a global measure). Overall satisfaction is relatively stable over time and a good indicator of firm performance (Anderson et al. 1994; Jones and Suh 2000; Parasuraman et al. 1994). Furthermore, overall satisfaction is a key determinant of consumer commitment (Heskett et al. 1994; McQuitty et al. 2000; Singh and Sirdeshmukh 2000; Szymanski and Henard 2001). In line with previous work, we conceptualise consumer commitment as a three dimensional construct, consisting of affective, temporal and instrumental elements (Allen and Meyer 1990; Garbarino and Johnson 1999; Gundlach et al. 1995). Affective commitment is a desire to

continue a relationship with an organisation because of a liking, or a positive attitude toward, the organisation. This positive affect is sometimes referred to as 'psychological attachment' (Garbarino and Johnson 1999). Temporal commitment refers to the longevity of the consumer's commitment to the organisation, or expectations of continuity, (Garbarino and Johnson 1999), and instrumental commitment taps into the idea that the consumer stays with the organisation because of the existence of perceived economic or psychological costs associated with leaving the relationship (Gundlach et al. 1995). Previous research indicates that consumer satisfaction increases consumer commitment (see for example, Gruen, Summers and Acito 2000). However, few studies have simultaneously examined all three dimensions of consumer commitment included in this study. We develop three related hypotheses about the relationship between consumer commitment and consumers' overall satisfaction.

H₃: There is a positive relationship between consumers' overall satisfaction with the service and (H_{3a}) their affective commitment, (H_{3b}) their temporal commitment and (H_{3c}) their instrumental commitment.

In addition to these direct relationships between overall satisfaction and the three dimensions of consumer commitment, we also predicted that there is a direct relationship between consumers' evaluations of service attributes and their affective, temporal and instrumental commitment. The relationship between consumers' evaluations of personal service and their commitment to the service provider has been reported in previous research (Garbarino and Johnson 2001; Garbarino and Johnson 1999; Spreng et al. 1996). We hypothesise that this type of relationship will also exist between consumers' evaluations of SST attributes and their commitment to the service provider. In other words, if the consumer rates the performance of the SST attributes highly, they are likely to have a favourable attachment to the organisation, to want to return to that organisation in the future and to feel that they may not get the same level of service elsewhere. This gives rise to the following hypotheses:

H₄: There is a positive relationship between SST attributes and (a) affective commitment, (b) temporal commitment and (c) instrumental commitment.

H₅: There is a positive relationship between personal-service attributes and (a) affective commitment, (b) temporal commitment and (c) instrumental commitment.

In addition to these direct effects, we also examine the impact of the frequency of use of the two service delivery options (SST and personal-service) and the type of customer (business or leisure) on the relationship between the evaluation of service attributes and overall satisfaction with the service. Past studies exploring the relationship between technology usage and user satisfaction present conflicting results. Igbaria and Nachman (1990) and Baroudi et al. (1986) report a positive relationship between technology usage and user satisfaction, whereas Ginzberg (1984) and Sanders (1984) report a small or insignificant relationship. These differences may be due to consumers' experience with SST. In the same way that personal-service interactions improve with repeated exposure to the service script (Zeithaml and Bitner 2003), we predict that consumers who are new to SST may find the technology difficult to use and consequently report low overall satisfaction with the service. With repeated exposure and familiarisation with the SST, consumers' evaluations of overall satisfaction may increase as the use of technology no longer represents a challenge to them.

This gives rise to the following hypotheses:

H₆: The positive relationship between SST attributes and overall satisfaction is stronger for consumers who used SST options more frequently during their hotel stay.

H₇: The positive relationship between personal-service attributes and overall satisfaction is stronger for consumers who used personal-service interactions more frequently during their hotel stay.

Finally, we explore the impact of the type of guest (business *cf.* leisure) on the relationship between their evaluations of service attributes and overall satisfaction with the service. We predict that leisure guests are likely to expect all elements of their stay to be completed for them as they are in the hotel for leisure or relaxation purposes, and as a consequence will place greater importance on personal service. Speed of service (one of the main benefits of SST) is perhaps not as important for leisure guests as it is for business guests. With this in mind, it is thought that business guests may be more likely to select SST facilities during their stay. Therefore, we hypothesise that the relationship between the personal-service attributes and SST attributes, and overall satisfaction will be moderated by guest type.

H₈: The positive relationship between service attributes and overall satisfaction will alter depending on guest type.

These relationships are identified graphically in Figure 1.

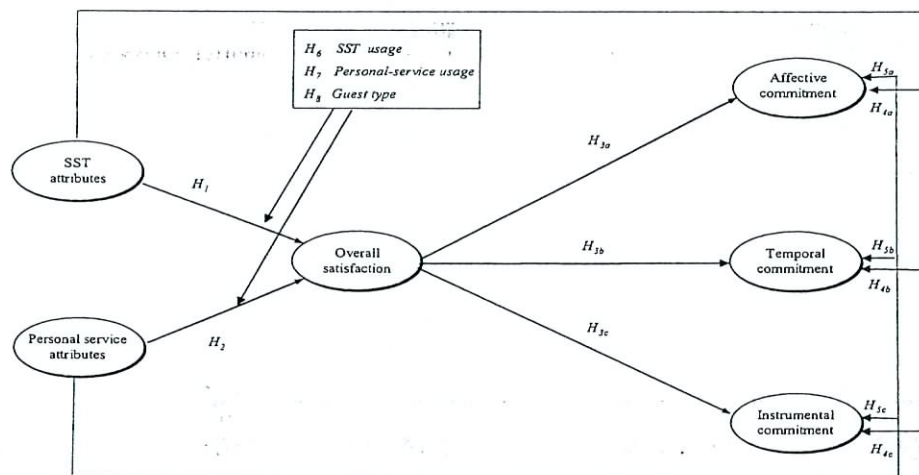


Figure 1. The relationships between service delivery mode attributes, consumer satisfaction and consumer commitment

Method

Where possible, the measures used in this study were adapted from existing scales published in the marketing and management literature. Measures of SST attributes were adapted from previous studies by Dabholkar (1996), Meuter et al. (2000) and Walker et al. (2000), and include reliable, easy to use, user control, enjoyable, low risk and convenient. Measures of personal-service attributes were adapted from studies by Bitner (1990), Goodwin and Gremler (1996) and Ostrom and Iacobucci (1995) and include friendly, responsive, prompt, informative, trustworthy and professional. All questions were measured using five-point Likert scales, anchors poor (= 1) and excellent (= 5).

Consumers' overall satisfaction with the service was measured using items reported by Ganesan (1994). Respondents were asked to describe their feelings about their overall experience of their last stay in their most frequently visited hotel. Affective commitment was

measured using items adapted from Allen and Meyer (1990) and Morgan and Hunt (1994), temporal commitment measures using items adapted from Ganesan (1994) and Kim and Frazier (1997), and instrument commitment was measured using items adapted from Barnes (1997), Gundlach et al. (1995) and Morgan and Hunt (1994). All commitment items were measured using Likert scales, anchors strongly disagree (= 1) and strongly agree (= 5). The research setting for the study was hotels in a metropolitan area in Australia. Respondents included leisure and business travellers. Three hotels participated in the study, each distributed survey packs to guests over a two-month period. These included; a cover letter explaining the study, a self-complete questionnaire and a reply-paid envelope. Approximately 1,000 survey packs were distributed and a total of 241 usable surveys were returned (24%). Respondents were roughly equally distributed males/females and had average age 41 years ($\sigma = 15$ years). The majority of respondents had completed senior high school and average income was AUD \$71,000 pa.

Results

First, items measuring each construct were analysed to confirm the dimensionality of each scale (Joreskog and Sorbom 1996). Confirmatory Factor analysis was conducted using structural equations modelling, examining the covariance matrix, using LISREL 8.54 (Joreskog and Sorbom 1996). The number of items in each scale, goodness of fit statistics and the reliability estimates are reported in Table 1.

Construct	No. of items	χ^2	Composite Reliability
SST attributes	4	1.15; 2 d.f., $p = .56$.92
Personal-service attributes	5	3.57; 5 d.f.; $p = .61$.93
Overall satisfaction	4	0.39; 2 d.f.; $p = .82$.95
Affective commitment	4	2.43; 2 d.f.; $p = .29$.91
Temporal commitment	4	0.43; 2 d.f.; $p = .80$.91
Instrumental commitment	5	0.45; 5 d.f., $p = .99$.79

Table 1. Fit statistics and reliability estimates for constructs employed in the study

After checking the fit of each set of measures, the two-step procedure described by Anderson and Gerbing (1988) was used. Consistent with the two-step approach, a measurement model was estimated first. The measurement model produced acceptable fit measures ($\chi^2(194) = 260.51$, $p < 0.0$, goodness of fit index [GFI] = .91, comparative fit index [CFI] = .99, root mean error of approximation [RMSEA] = .04). At this stage, no problems were identified with the items (e.g., loadings were significant, error terms were small). Modification indices, however, suggested the deletion of several items (two from instrumental commitment, one from temporal commitment and one from overall satisfaction). Discriminant validity was assessed for each pair of constructs following the procedure recommended by Fornell and Larcker (1981) and Kelloway (1995), and was achieved across all possible pairs of constructs in this study using both criteria.

Following estimation of the measurement model, a structural model examining the relationships between the constructs was tested (see figure 1). Fit statistics for the structural model included: $\chi^2(196) = 269.09$, $p = 0.0$, GFI = .91, CFI = .99, RMSEA = .04. The relationship between SST attribute performance and overall satisfaction (H_1) is significant (0.17, $t = 2.70$), as is the relationship between personal-service attribute performance and overall satisfaction (H_2) (0.50, $t = 7.53$). As predicted, the relationship between overall satisfaction and affective commitment (H_{3a}) is positive and significant (0.26, $t = 3.42$).

Additionally, the relationship proposed between overall satisfaction and temporal commitment (H_{3b}) is also positive and significant (0.16, $t = 2.11$). The relationship between overall satisfaction and instrumental commitment (H_{3c}), however, is not significant (-0.13, $t = -1.29$).

The next two sets of hypotheses explore the impact of the attributes on the dimensions of commitment. The relationship between SST and affective commitment (H_{4a}) is positive and significant as hypothesised (0.25, $t = 3.75$). Additionally, the path from SST attributes to temporal commitment (H_{4b}) is also positive and significant (0.22, $t = 3.43$), as is the path from SST attributes to instrumental commitment (H_{4c}) (0.26, $t = 2.92$). As predicted, the relationship between personal-service attributes and affective commitment (H_{5a}) is positive and significant (0.19, $t = 2.57$), as is the relationship between personal-service attributes and temporal commitment (H_{5b}) (0.40, $t = 5.11$). The last hypothesised relationship, between personal-service attributes and instrumental commitment (H_{5c}) is not significant (0.10, $t = 1.06$). The proposed model accounts for a proportion of the variance in overall satisfaction (33%), temporal commitment (38%) and affective commitment (30%). The proposed model, however, only explains 8% of the variance in instrumental commitment.

The next stage of the analysis was to examine the potential moderating impact of interaction frequency and guest type. Using the procedure outlined by Babin and Boles (1998), the first stage was to estimate a constrained model, where all of the paths were constrained to be invariant across the two groups (frequency of personal-service and SST interaction, and business and leisure guests). Note that these constraints were not intended to improve the fit of the model to the data rather their purpose was to make possible the identification of potential moderating impacts. Following this, the fit of the constrained model was compared to the fit of an unconstrained model, in which the structural paths were allowed to vary across the groups. A chi-squared difference test between the overall fit of the two models provides a significance test of possible moderating impacts. A second test explored the chi-squared differences across the individual paths estimated in the structural model. This test involved constraining the paths to be invariant across the two groups and freeing each path individually. The hypothesised model was used as a basis for these tests, with moderating impacts explored using a multi-group procedure.

Moderating variable	Model	χ^2	df	GFI	CFI	RMSEA	$\Delta \chi^2$	p^a
SST frequency	A	530.99	445	0.80	0.98	0.04	12.64	NS
	B	518.35	434	0.81	0.98	0.04		
Personal-service frequency	A	658.60	445	0.70	0.97	0.06	40.05	0.05*
	B	618.55	434	0.72	0.97	0.06		
Guest type	A	520.76	445	0.80	0.99	0.04	7.84	NS
	B	512.92	434	0.80	0.99	0.04		

* Significant, NS. non significant.

Table 2. Structural equations results for moderating impacts models

Interaction frequency, that is, how often the guest interacted with SST and personal-service during their hotel stay was measured as high or low SST interaction frequency and high or low personal-service interaction frequency. Personal-service interaction frequency was found to be the only significant moderating variable. Guest type (business *cf.* leisure) and SST interaction frequency do not appear to moderate the relationships in the model. Table 2 illustrates the results for the moderating impacts.

Table 3.
and
Path
values

Relationship within hypothesised model	Personal-service usage	
	High	Low
Overall satisfaction → Instrumental commitment	-0.01 -0.13	-0.38 -2.26
Overall satisfaction → Temporal commitment	0.17 1.87	0.03 0.22
Overall satisfaction → Affective commitment	0.22 2.44	0.25 1.92
SST attributes → Overall satisfaction	0.12 0.56	0.19 1.69
Personal-service attributes → Overall satisfaction	0.52 6.23	0.38 3.21
SST attributes → Instrumental commitment	0.22 2.11	0.25 1.69
SST attributes → Temporal commitment	0.18 2.45	0.27 2.14
SST attributes → Affective commitment	0.20 2.52	0.27 2.20
Personal-service attributes → Instrumental commitment	0.14 1.13	-0.08 -.052
Personal-service attributes → Temporal commitment	0.46 4.65	0.20 1.49
Personal-service attributes → Affective commitment	0.32 3.39	-0.07 -1.33

High
Low
and T-
for

Personal-Service Interaction Frequency

Table 3 illustrates the changes in the standardised path coefficients (from the low group to the high group) in the presence of personal-service interaction. An additional test was conducted to determine the chi-squared difference across the individual paths, in the presence of personal-service interaction. This additional test indicated that there were three paths significantly different between the high group and the low group in the presence of personal-service interaction frequency. However, only the hypothesised path was significant in magnitude. That is, the hypothesis (H₇) between personal-service attributes and overall satisfaction was supported in the presence of personal-service interaction frequency. Thus, when consumers frequently have positive face to face interactions with staff during their hotel stay, this has a large contribution toward their overall satisfaction with the stay.

Discussion and summary

This paper develops and tests a conceptual framework linking consumer satisfaction and consumer commitment, with perceptions of SST and encounters with service employees. The study suggests that the relationship between consumers' evaluations of SST performance and their overall satisfaction with the service is not significant. This result is inconsistent with those suggested by Dabholkar (1996) and Meuter et al. (2000). One possible explanation of these findings is that in the presence of personal-service, and in a hotel setting, SST does not contribute to overall satisfaction, as the majority of interactions are likely to be personal-service based. Our findings support previous research indicating that consumer's evaluations of personal-service impacts significantly their overall satisfaction with the service (see also Bitner 1990; Crosby and Stephens 1987; Ostrom and Iacobucci 1995). The third series of hypotheses focused on the relationships between overall satisfaction and affective commitment, temporal commitment, and instrumental commitment. H_{3a} was supported, suggesting that consumers who are satisfied with their stay will have a "liking" or an

emotional attachment to the hotel. This finding is consistent with previous studies (see for example, Allen and Meyer 1990; Garbarino and Johnson 1999; Gruen et al. 2000). H_{3b} was also supported, suggesting that consumers who are satisfied overall with their hotel stay are likely to see themselves returning to the hotel over time. This is consistent with the findings of Dwyer et al. (1987), and Garbarino and Johnson (1999). Finally H_{3c} was not supported, suggesting that consumers' overall satisfaction with the hotel experience does not necessarily mean that they will return to the hotel, even if they feel they would disadvantage themselves by changing to another hotel. This finding contradicts those of Dwyer et al. (1987) and Allen and Meyer (1990). A possible explanation for this is the context in which the research was conducted. Hotels operate in a highly competitive market, star ratings and the easy availability of hotels belonging to large branded chains may result in consumers feeling that they are able to receive approximately the same service levels and quality regardless of the actual hotel. Perceived switching costs, associated with changing hotels, are consequently reduced, resulting in reduced instrumental commitment. This relationship warrants further exploration in different research contexts (such as financial or legal services) where there may not be as much perceived consistency in the service offered.

After the estimation of the full model, a series of moderating impacts were explored. The results of these revealed that the frequency of interaction between the consumer and the service staff impacts the relationship between the customers' evaluations of the service attributes and their overall satisfaction. That is, the more the consumer interacts with service staff the greater the contribution that elements of these personal-service interactions make to their evaluations of overall satisfaction. This result is in line with comments by Zeithaml and Bitner (2003) who indicate that through repeat exposure to the service script consumers become more comfortable with service delivery. Bateson (1992) also asserts that consumers need to understand their role (and service script) in the service encounter; repeat exposure to the encounter can develop their understanding of this role, and consequently overall satisfaction with the service will be increased.

Interestingly, in the presence of high personal-service interaction, the relationship between SST attributes and overall satisfaction also showed a significant difference between the high and the low usage groups. However, although this additional path indicated significant differences between the two usage groups, the t-statistics of this path indicated that it was not significant in the presence of either low or high personal-service interaction frequency. Therefore, although this suggests some altering of the relationship, due to the non-significance of the path, the result can not be stated with any certainty and should be investigated further. A possible explanation for the lack of significant difference for SST interaction frequency may be that there are other factors, such as attitude toward using SST or general technology usage, which are more important than frequency of use during the particular hotel stay. Perhaps, if the consumer does not have a positive attitude toward using SST this may alter the relationship between SST attributes and overall satisfaction. Dabholkar (1996) and Dabholkar and Bagozzi (2002) found that attitude toward using SST has a direct impact on intention to use SST, however, it has not been explored as a moderating impact. Another potential moderator could be general technology usage. This has been used successfully as a moderator in another study investigating SST, between need for interaction with a service employee and attitude toward using a new computerised self-service delivery option (Dabholkar 1992). It has also been found to have a direct impact on user satisfaction (Baroudi et al. 1986; Igarria and Nachman 1990). It is possible that this could moderate the relationship between SST and overall satisfaction, as familiarity with general technology may make consumers more comfortable with SST. The final moderating impact explored in this

study, guest type, was also found to be non-significant. That is, there was no significant difference between leisure guests and business guests. A possible explanation may be that context overruled the influence of guest type. That is, consumers' expectations were tied more to the quality rating of the hotel (star rating) rather than the individual preferences the respondents had for their type of stay (leisure or business). It makes sense to presume that quality ratings have a great impact on expectations of a hotel stay for all guest types.

The results of this study suggest that there is further research required to examine the relationship between SST and consumer commitment. This is a new area of research and the results of the current study suggest that SST may impact consumers' intentions to return to a hotel. Further research needs to explore this relationship in other contexts where the use of both SST and personal-service is more balanced, such as banking. Service managers need to be aware of the impact of SST on consumer satisfaction and commitment. It appears in a context such as hotels, SST adds little to these outcomes. The appropriateness of investment in these technologies therefore needs to be examined in this context. Perhaps better returns could be achieved with more investments in staff training, with the aim to improve personal-service encounters. The relationship between the three commitment dimensions also warrants further investigation particularly in other contexts. This study suggests that instrumental commitment is not as strongly related to overall commitment as affective and temporal commitment. Perhaps given the competitiveness of the current context, instrumental commitment does not represent consumer commitment, but rather represents another construct such as risk avoidance. An important direction for further research is to examine alternative measures of the variables examined in this study. In particular, our measurement model uses reflective items to measure SST performance and personal-service performance. An alternative to this would be to develop formative measures for these constructs (see for example Diamantopoulos and Winklhofer 2001). Such formative measures may better represent the constructs of interest and could provide a platform for replicating this research in other service contexts.

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